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## Aseptic Delivery and Artificial Rearing : a Technique for Disease Control in Pigs

BY
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**Ministry of Agriculture, Veterinary Laboratory, Weybridge, Surrey**

ALTHOUGH aseptic farrowing and artificial rearing of piglets have been in use for a number of years as techniques for the production of disease-free and antibody-free pigs for research purposes, it is only comparatively recently that their potentialities for control of disease on the farm have begun to be realised.

Already some of the more progressive pig breeders, troubled by the continued presence of chronic respiratory disease or other low grade infection in their stock, and aware of the possibility that freedom from certain diseases could be a necessary qualification for participation in a National Progeny Testing Scheme as is already the case in Scandinavia, are interested in rebuilding their herds from nuclei of disease-free stock (Parsons, 1955) and may be expected increasingly to seek the advice of the practising veterinary surgeon in carrying out the process.

While the production of disease-free pigs has received a good deal of attention in America, largely due to the pioneer work of Young & Underdahl (1951, 1953, 1955) little has been written on the subject in British journals. It is hoped that the present paper will be useful as a summary of the principles which have so far emerged and their application to conditions in Britain.

### Potentialities

Basically the method consists of removing piglets aseptically from their dam either at normal birth or by caesarean section, rearing them artificially away from other pigs and eventually using them as a breeding nucleus to replace the main herd, the changeover being effected after thorough disinfection of the piggery. Thereafter breeding proceeds normally except that new blood can be introduced only from other disease-free herds or by artificial insemination, and showing and breeding movements are similarly restricted.

It can be expected to control those diseases which are acquired from other pigs after birth, and though such conditions as ascariasis and erysipelas may creep back into a clean herd kept on land which has housed pigs before, closed clean herds should remain free

from host-specific obligate parasites. Young, Underdahl & Hinz (1955) were able to by-pass swine dysentery, transmissible gastro-enteritis and mange in one herd by artificial rearing, and work in the United States Department of Agriculture (1953) has shown that the method is also applicable to atrophic rhinitis. In the United Kingdom it would seem to have potentialities for the control of infectious rhinitis and virus pneumonia (V.P.P.) both of which appear to be contracted by the piglet after birth, usually from the sow.

The feasibility of such a project in a particular herd will obviously depend not only on the owner's keenness to obtain a disease-free breeding nucleus, but also on the availability of suitable facilities for collecting the piglets aseptically and suitable premises for rearing them, and on the enthusiasm of the staff who will actually be doing the work.

The necessity for scrupulous thoroughness and attention to detail is stressed by all who have used the method successfully, as Young *et al* (1955) who say, " in the use of these techniques to eradicate infectious diseases from swine, there is no such thing as relatively clean procedures. The break with infection must be absolute, because of the ability of infectious agents to reproduce themselves. Failure to handle one animal properly results in disease in that animal and possibly in all other animals with which it comes in contact." Furthermore, a clear distinction should be drawn between the classical methods of aseptic delivery of Young & Underdahl in which there is absolute separation of the piglet and its dam, and those procedures which allow supervised suckling of potentially infected sows, as those of Luscombe (1955) and Johnson, Bone & Oldfield (1955).

## The Donor Sows

Apart from representing the best blood lines in the herd, sows should be chosen on the basis of tractability and breeding history. The farrowing date of sows is generally more predictable than that of gilts and parturition is likely to be quicker and freer from obstetrical complications. Pen mating is obviously an essential practice if unnecessary waste of time and " missed " litters are to be avoided.

Theoretically the number of litters harvested aseptically should be unlimited, but under farm conditions it has been found that piglet morbidity and mortality tend to increase with the number of litters processed. The present writer's recommendation is that an attempt be made to collect the litters of four or five sows farrowing within a month or six weeks, keeping a further two sows in reserve in case of accidents or miscalculations.

A normal pregnancy on a completely adequate diet is the ideal to aim at, and any sow which has had any systemic disease during the period of gestation should be rejected.

Removal of her piglets at birth normally causes no mammary disease in the sow and she can be returned to the breeding herd and be mated at the next heat if required.

## Methods of Harvesting the Piglets

True caesarean section (Young *et al*, 1955) carried out in the slaughterhouse has the advantage that (1) it is relatively speedy, (2) it can be carried out at a time to suit the operator, usually two to six days before term, and (3) the risk of contamination is low since the piglets do not traverse the birth canal.

Collection of the piglets by premeditated surgical hysterotomy or hysterectomy does not appear to have been tried. The operation would obviously be time-consuming and the choice of anaesthetic limited, but there would appear to be no insuperable obstacles.

The method which is probably best adapted to British conditions is that in which sows are farrowed in crates and the piglets caught in sterile containers. The American workers have used sterile canvas bags to catch the piglets in, but we have found that enamel basins as suggested by Codrington (1954) are quite satisfactory and indeed preferable when dealing with lively piglets. Several basins are kept immersed in an antiseptic solution such as Cetavlon 1 per cent. in a larger basin until required. Just before a piglet is delivered a basin is emptied and its edge pressed against the sow's buttocks (kept clean by repeated washings) so that the newborn piglet falls into it and being unable to obtain a grip with its feet cannot scramble out. The piglet is then dried with sterile towels and put in a clean box with a hot-water bottle to await transport. Ligaturing of the umbilical cord is carried out at this stage or when all of the litter has been collected.

Almost any design of movable farrowing crate can be used but where collection of a number of litters is contemplated it might be worth while modifying one on the lines of the crate in use at Weybridge, which is raised some 2 ft. above ground level on stout legs provided with wheels.

## Housing the Piglets

Strict segregation from all other pigs is essential with a separate attendant and separate buildings, preferably on a different holding from the rest of the herd.

Elaborate brooders, on the other hand, are apparently not essential so long as they provide warm, dry, draught-free conditions with a certain amount of light. An infra-red bright emitter can be used to make a warm bright area for the piglets to lie in with a dull emitter acting as a booster and controlled by a thermostat set at 80° to 85° F. for the first few days gradually reducing to 70° F.

## Feeding the Piglets

A great deal has been written about artificial feeding of piglets but it is gradually becoming clear that the baby pig is very accommodating in this respect, and, though an improved dietary for the first three weeks of life is still urgently required, pigs can be reared successfully on very simple formulations.

Pigs get no globulins *in utero* and artificially reared piglets are denied maternal globulins after birth, and, though they will survive without if sheltered from infection, antibodies can be supplied by normal pig serum either fed within six to eight hours of birth or administered parenterally. Swine *gamma* globulins

can be prepared (Cammarata & Deutsch, 1950) but are apparently not yet available commercially in this country. Shanks (1955) has recommended the routine use of *B. coli* antiserum for piglets reared artificially.

Cow's milk (preferably homogenised and pasteurised) can be fed either fortified at the rate of one whole egg per quart for the first month (Young & Underdahl, 1953) or unfortified (Shand, 1954). The piglets can be fed every two hours between 4 a.m. and midnight (Shand, 1954) or three times a day (Young & Underdahl, 1953), and the milk may be either heated to blood temperature or fed cold (Tribe, 1954). Bottle feeding may be practised for the first few days, but piglets can be persuaded to drink from the trough from the first feed, especially if this is withheld for several hours. However, the drinking vessels *must* be clean (duplicate sets are useful) and should be shallow enough to prevent the very young pig from aspirating milk and stable enough to prevent the piglets from overturning them.

All piglets are probably the better for receiving supplements of iron and Vitamins A and D, but there is still great diversity of opinion as to what other supplements are necessary and the requirements of different litters may well be expected to vary.

Solid food (in the form of sow milk replacer, creep feed or sow-and-weaner meal fed dry) can be introduced within the first week, and at this stage water should be provided in a separate container.

For the first three to four weeks of life artificially reared piglets usually lag behind naturally suckled pigs but by the time they reach eight weeks of age they may weigh up to 50 per cent. more than comparable pigs left on the sow.

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## SWISS VETERINARY STUDENT

A 26-year-old Swiss veterinary student in his seventh semester at Zurich University would like to stay in England for a month in September, or earlier if possible.

He would like to see an animal hospital or a small animal practice in London. He speaks fairly good English.

Will any veterinary surgeon who would be good enough to receive this student for a short visit, please write to the General Secretary of the B.V.A.?

# The Efficiency of Piperazine Adipate Administered in Bran Mash to Horses


BY

**D. POYNTER**

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### Introduction

IT is established that piperazine adipate is a useful veterinary anthelmintic (Sloan, Kingsbury & Jolly, 1954), and it is also known that the compound has a definite application in the treatment of parasitic infections of horses (Poynter, 1955). At present, however, the majority of tests carried out with the new anthelmintic in horses have involved its administration by stomach tube, although Sloan *et al.* (*loc. cit.*) do mention that two horses ate it in bran mash.

It was decided to determine the efficiency of piperazine adipate* when administered in bran mash to see how the results compared with those already published by Poynter (1955) for administration of the compound, dissolved in water, by stomach tube.

### Experimental Procedure

Egg counts were performed on nine thoroughbred horses in training. All were harbouring strongyles and ascarids. Piperazine adipate was administered to the animals, the anthelmintic being incorporated into bran mash. All nine were accustomed to this type of food and readily accepted the medicated diet. Egg counts were again carried out ten days after dosing.

### Results

The complete results together with the ages of the horses and amounts of anthelmintic used are given in the accompanying table.

RESULTS OF TREATING NINE HORSES WITH PIPERAZINE ADIPATE MIXED IN BRAN MASH

| No. | Age (years) | Dose (grammes) | E.P.G. before | | E.P.G. after | |
|---|---|---|---|---|---|---|
| | | | Strongyles | Ascarids | Strongyles | Ascarids |
| 1 | 3 | 70 | 10 | 600 | 5 | 0 |
| 2 | 2 | 70 | 300 | 1,400 | 10 | 0 |
| 3 | 3 | 70 | 59 | 25 | 5 | 0 |
| 4 | 3 | 70 | 36 | 34 | 0 | 0 |
| 5 | 3 | 70 | 31 | 11 | 5 | 0 |
| 6 | 2 | 70 | 500 | 32 | 21 | 0 |
| 7 | 2 | 70 | 251 | 4 | 8 | 0 |
| 8 | 3 | 60 | 8 | 100 | 4 | 0 |
| 9 | 3 | 60 | 22 | 200 | 4 | 0 |

In all cases the ascarid egg counts were reduced to zero and reductions in strongyle egg counts also occurred. The results compare favourably with those obtained when the anthelmintic was administered by stomach tube dissolved in minimum quantities of water.

* "Coopane." Cooper McDougall & Robertson Ltd.

(*Concluded at foot of col. 1 overleaf*)

# The Effect of Commercial Phenothiazine on Blood Iodine Values in Sheep

BY
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AND
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DURING 1951-53 observations on the goitrogenic effects of various diets were carried out on groups of pregnant ewes, some of which were kept at the Veterinary Laboratory at Weybridge and some at the Wellcome Veterinary Research Station at Frant. These studies involved the determination of protein-bound and total iodine levels in the plasma and in a few cases measurement of the uptake of $I^{131}$ by the thyroid glands. In certain groups of ewes kept at Frant, blood iodine levels, especially the total plasma iodine contents, were very variable and at times extraordinarily high. These abnormal variations did not occur in the blood iodine values for the sheep kept at Weybridge. To try to find the explanation for these variations some of the sheep at Frant were divided into sub-groups and moved from field to field to check the possibility of contamination of pastures with iodine compounds.

It was also observed that in the few ewes at Frant on which measurements were made, there was no uptake of $I^{131}$ by the thyroid glands, whereas in similar ewes at grass at Weybridge there was a definite uptake.

At this time the reports of Talmage, Nachimson, Kraintz & Green (1953) and of Talmage, Trum, Monroe & Rust (1953) were noted. These drew attention to the suppression of $I^{131}$ uptake by the thyroids of rats and burros fed certain commercial phenothiazine preparations and also pointed out that some of these contain significant quantities of iodine (0.3 per cent.). It was then realised that the routine dosing of sheep at Frant with 20 g. phenothiazine at frequent intervals may have accounted for the variations in blood iodine values, since the sheep at Weybridge had not been dosed. Blood samples had been taken for estimation of iodine from other sheep at Weybridge which had been dosed with phenothiazine and abnormally high values had not been found. It was possible, however, that the unexpectedly high blood iodine values in the Frant ewes might be due to the high iodine content of the particular preparation of phenothiazine then being used there, since it was not the same as that used at Weybridge.

## Experimental Procedure

The iodine content of various commercial preparations of phenothiazine was estimated and two of these were selected for experimental observations.

Blood iodine levels were followed at frequent intervals before and after administration of these preparations on four and then two ewes at Weybridge, but in order to keep the number of blood iodine estimations as low as possible, blood samples were taken from eight ewes at Frant only once before and once after administration of phenothiazine and from a control group of eight before and after treatment with a copper sulphate/nicotine sulphate anthelmintic mixture. Romney Marsh ewes kept under grazing conditions were used at both places, but when blood samples were taken at one- to three-day intervals at Weybridge, the two ewes were kept in stalls for the period concerned.

The method used for determination of iodine was based on adaptations of the methods described by Riggs & Man (1940) and Taurog & Chaikoff (1946).

## Results

(1) *Blood iodine values of 12 ewes grazing at Frant 1952-53.*

Fig. 1 illustrates the abnormally high plasma total iodine values observed in the December, January, February, March and April blood samples taken from 12 ewes at grass at Frant, compared with values obtained for October and November blood samples from these ewes. Results obtained from ewes at grass at Weybridge indicated that the October and November values fell within the " normal " range for ewes at grass. The dates on which phenothiazine was administered to the ewes at Frant as a routine anthelmintic treatment are also indicated in Fig. 1. No phenothiazine was given during the tupping period September, October, November. The first subsequent dose was given on December 4th and blood samples taken on December 11th showed a very marked elevation in total plasma iodine.

(2) *Iodine content of Phenothiazine*

The results of the analysis of various phenothiazine preparations are given in Table I.

It will be seen that there is a considerable variation in iodine content. Phenothiazine is produced by condensation of diphenylamine with sulphur in the presence of a catalyst. It is known that iodine in one

## Conclusion

The efficiency of piperazine adipate as an equine anthelmintic is in no way impaired by incorporating it into bran mash.

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TABLE I

IODINE CONTENT OF VARIOUS COMMERCIAL PREPARATIONS OF PHENOTHIAZINE

| Phenothiazine preparation ... | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| Per cent. iodine ... ... | 0·40 | 0·37 | 0·33 | 0·31 | 0·084 | 0·076 | 0·019 | 0·0004 |

TABLE II

EFFECT OF ADMINISTRATION OF A HIGH-IODINE PHENOTHIAZINE PREPARATION ON PLASMA IODINE LEVELS OF EWES AT FRANT

| Reference | Treatment | μg. iodine per 100 ml. plasma | | | |
|---|---|---|---|---|---|
| | | Total | | Protein-bound | |
| | | Mean | Range | Mean | Range |
| Group I (eight ewes) (Control) | Before dosing ... ... ... ... ... ... | 5·33 | 5·3– 5·7 | 3·90 | 3·6–4·0 |
| | Three days after dosing with copper/nicotine sulphate mixture ... ... ... ... ... ... ... | 5·10 | 4·9– 5·3 | 4·0 | 3·6–4·1 |
| Group II (eight ewes) (High-iodine phenothiazine) | Before dosing ... ... ... ... ... ... | 5·30 | 4·9– 5·7 | 3·86 | 3·6–4·5 |
| | Three days after dosing with 20 g. phenothiazine containing 0·3 per cent. iodine ... ... ... ... | 15·0 | 11·0–17·0 | 4·45 | 4·1–4·9 |

form or another is a catalyst commonly used in the preparation of phenothiazine and the amount of iodine remaining in the final product may vary according to treatment of the crude material. The very low iodine content of sample H may have been accidental due to the fact that a large tin of tablets which was not tightly closed had been left in the Chemical Laboratory at Weybridge for a period of several years and this may have resulted in loss of iodine.

(3) *Effect of administration of phenothiazine on plasma iodine levels*

(a) *Plasma iodine levels before and after administration of a preparation of low iodine content to ewes at Weybridge*

Blood samples from four ewes (Nos. 3803, 3804, 3805, 3806) were taken at approximately monthly intervals for a period of five months to observe any variations in total and protein-bound iodine levels. On March 24th, 1954 they were given 30 g. each of phenothiazine tablets (6 x 5 g.) having a very low iodine content of 0.0004 per cent. (preparation H, Table I). Blood samples were taken immediately before administration and again after seven days. The results, shown in Fig. 2, indicate only very slight variations during the pre-dosing period, mean protein bound and total plasma iodine values ranging from 2.6 to 3.1 and 3.9 to 5.0 μg. per 100 ml. plasma respectively. There was a slight but definite elevation in both fractions seven days after administration of the low-iodine phenothiazine preparation, but values had returned to normal when the next blood samples were taken 40 days later. This elevation was a little unexpected since it was thought that insufficient iodine was present in the phenothiazine to affect blood iodine levels.

(b) *Plasma iodine levels after administration of a preparation of high iodine content to ewes at Weybridge and Frant*

*Weybridge.*—On May 10th, 1954, two of the ewes (Nos. 3804 and 3805) on which observations were made in (a) were given 20 g. each of phenothiazine tablets (4 x 5 g.) having a high iodine content of 0.37 per cent. (preparation B, Table I). Blood samples were taken immediately before dosing and subsequently at daily intervals for five days, then at two- to three-day intervals for the next 16 days, making a total period of 21 days during which observations were made. Results are shown in Fig. 3.

There was a marked elevation in total plasma iodine values for nine days following administration of the phenothiazine preparation. In the case of ewe No. 3805 the maximum value was reached the day after dosing, but in the other ewe (No. 3804) there was a gradual build-up to a maximal elevation about the seventh day. Total iodine values were still a little above the pre-dosing level three weeks after giving the phenothiazine.

As would be expected, elevation of protein bound iodine values was very much less marked; they did not run parallel with total iodine values. Pre-dosing values were the same for each ewe, *viz.*, 2.9 μg. per 100 ml. plasma, but subsequent elevation was more rapid in ewe No. 3805 than in ewe No. 3804. It is of interest that 21 days after administration of this phenothiazine preparation, protein-bound iodine values were still above pre-dosing levels.

*Frant.*—Results for the eight ewes at Frant given a similar dose (20 g.) of the same phenothiazine are given in Table II together with data for a control group of eight ewes treated with a copper sulphate/nicotine sulphate anthelmintic mixture. It is evident that total plasma iodine values for the ewes given the high-iodine phenothiazine were elevated to approximately the same level as that observed in ewe No. 3804 at Weybridge at the same time after treatment. In ewe No. 3804 the total plasma iodine value was 17.0 μg. per 100 ml. and the mean value for the eight treated ewes at Frant was 15.0 (range 11.0 to 17.0) μg. per 100 ml. Again there was an increase in the protein bound iodine values of these eight ewes similar to that observed in the two Weybridge ewes. There was no elevation in blood iodine values of those ewes which received the copper sulphate/nicotine sulphate mixture.

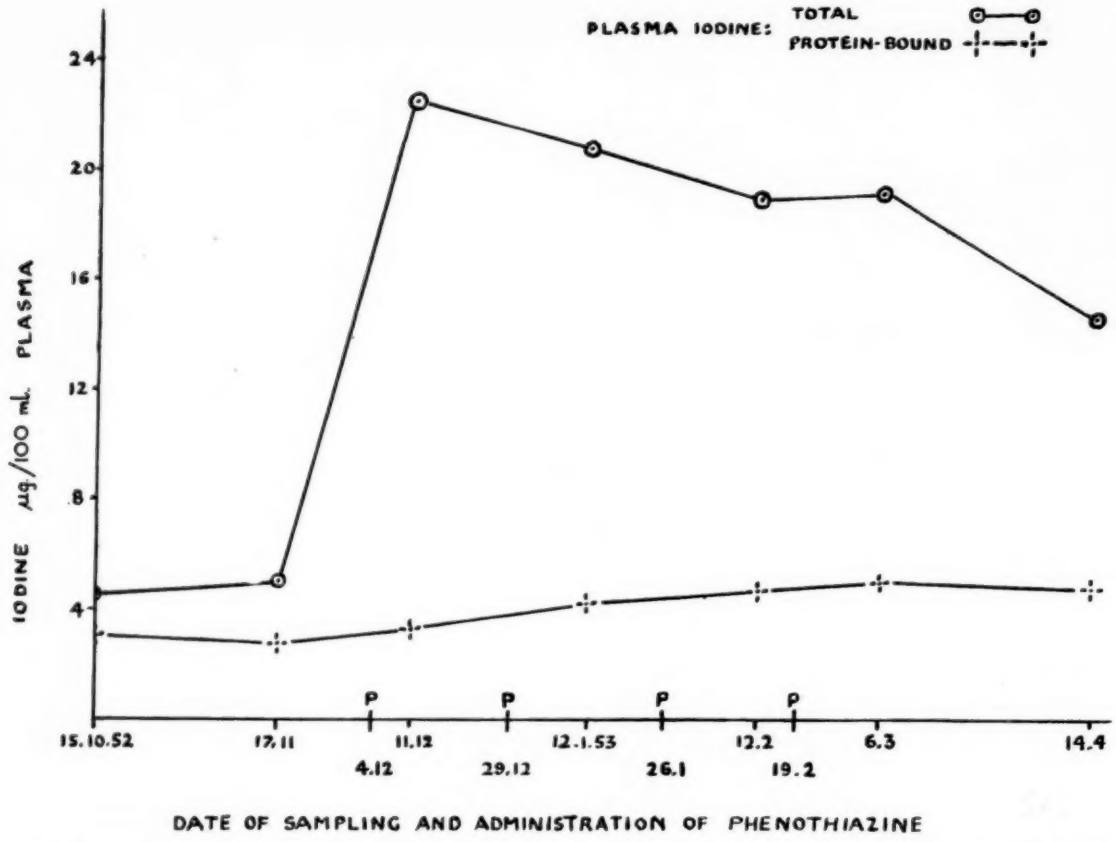


FIG. 1.—Mean plasma iodine values of 12 grazing ewes at Frant which were dosed at intervals with 20 g. each of phenothiazine.

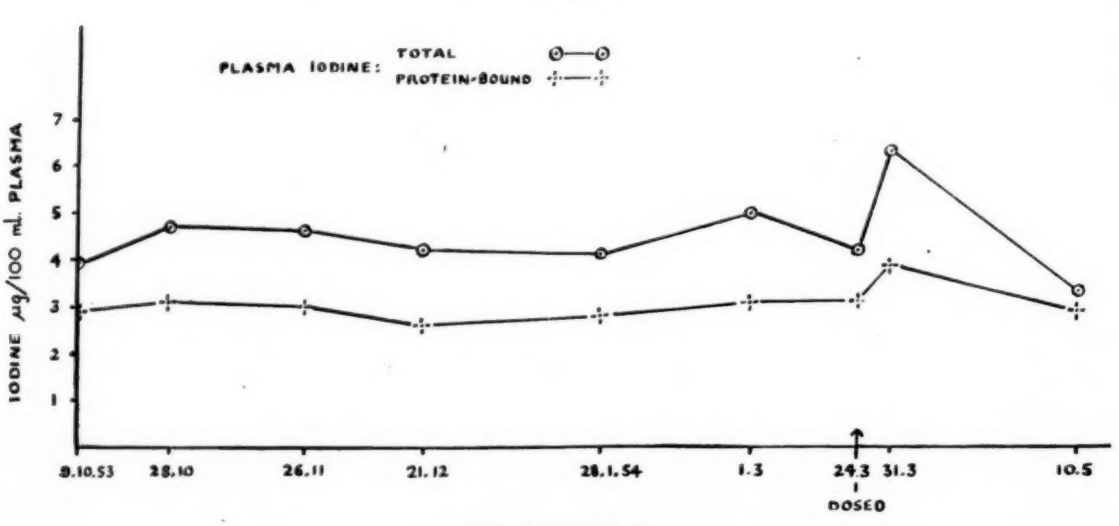


FIG. 2.—Mean plasma iodine values of four grazing ewes at Weybridge over a period of five months, and after administration of 30 g. each of a phenothiazine preparation of low iodine content.

## Discussion

Comparison of data obtained after dosing ewes with phenothiazine of known high iodine content with results obtained from ewes grazing at Frant during 1952-53 clearly indicates that the abnormally high total plasma iodine values in the latter group of ewes was associated with administration of phenothiazine. From Fig. 1 it appears that abnormally high total plasma iodine values were maintained throughout a period of five months, but since blood samples were taken at only monthly intervals it is possible that values fell to much lower levels than indicated and followed a pattern similar to that shown in Fig. 3. But the data in Fig. 3 show that total plasma iodine values did not return to normal until about three weeks after administration of one dose of high-iodine phenothiazine, so that after several doses, blood iodine levels may be maintained at a high level for a longer period than three weeks. Therefore, when sheep are being dosed regularly with phenothiazine containing appreciable quantities of iodine, blood iodine values may remain abnormally elevated for a considerable period. It is not yet known whether this would have any adverse effect on certain physiological functions of sheep and experiments are under way to investigate this possibility.

Talmage *et al* (1953) and Talmage, Monroe & Comar (1954) have suggested that the reduced uptake of $I^{131}$ in farm animals which had been given

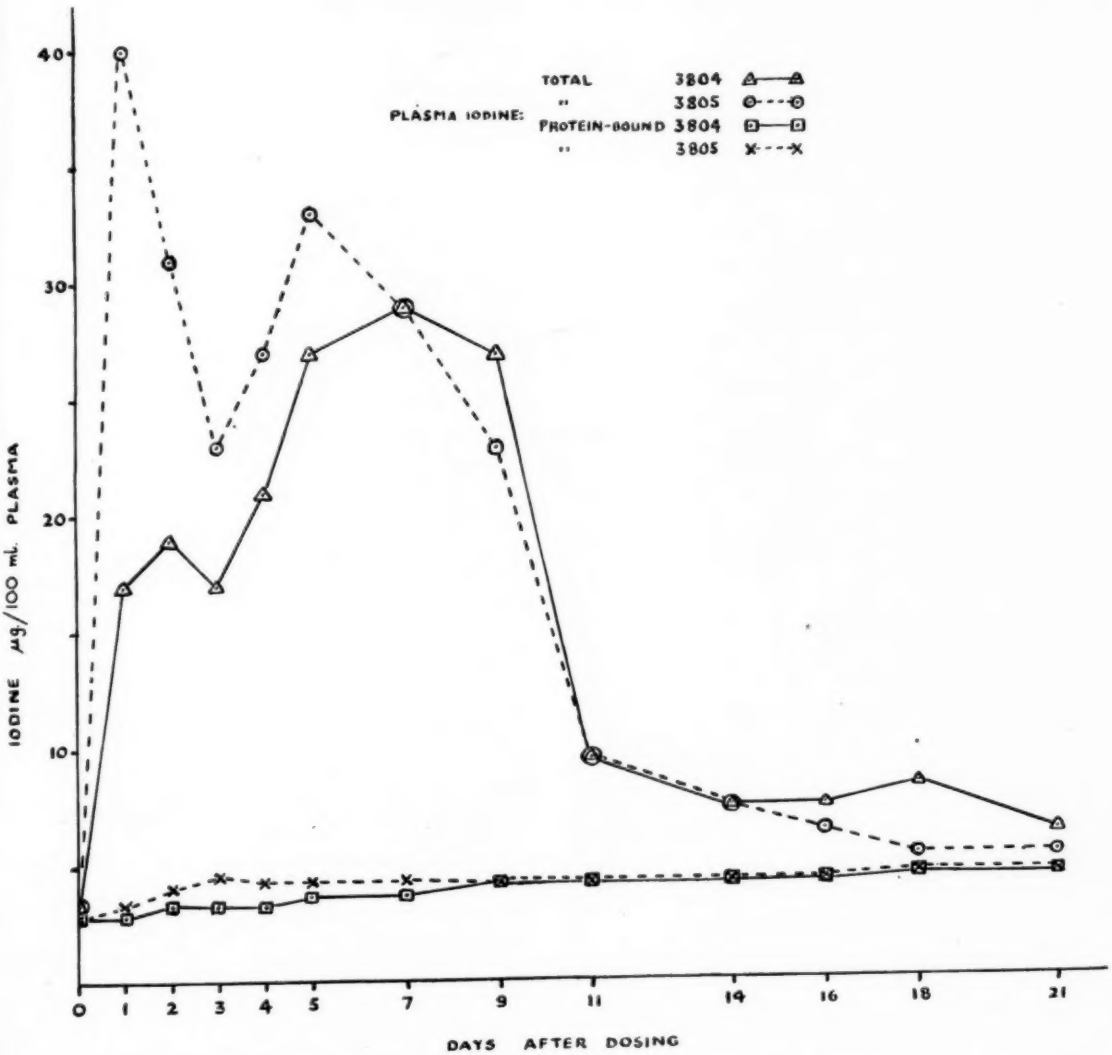


FIG. 3.—Plasma iodine values of two ewes at Weybridge after administration of 20 g. each of a phenothiazine preparation of high iodine content.

various phenothiazine preparations may be indicative of an induced hypothyroidism. No reduction in uptake of $I^{131}$ was observed by these workers after administration of purified phenothiazine. They therefore suggest that the reduction may be due either to the appreciable amounts of iodine known to be present in many commercial phenothiazine preparations, or to an unknown antithyroid compound present in the impurities in the preparations they used. From the data obtained in the observations now reported it would appear that the reduced uptake of $I^{131}$ observed in the sheep at Frant, was due to saturation of the iodine-collecting mechanism of the thyroid gland. That the iodine in the phenothiazine preparations was readily liberated and absorbed into the blood stream, is shown by the very high total plasma iodine values found after administration of these preparations. This effect was similar to that observed in cattle after administration of exogenous iodine (Allcroft, Scarnell & Hignett 1954). Pitt-Rivers (1950) pointed out that iodide above a certain concentration in the plasma will inhibit the incorporation of iodine into the normal glands and discussed the still unknown mechanisms whereby iodide exerts its inhibiting action on the thyroid. Talmage *et al* (1954) discuss the possibility that the excess iodide in certain phenothiazine preparations might result in a reduced output of total thyroxine. The fact that the protein bound iodine values of the ewes at Frant which had repeated dozes of phenothiazine were not low and did not come within the range (1.0 to 2.2 $\mu$g. per 100 ml. plasma) observed for ewes fed on a goitrogenic diet and which gave birth to goitrous lambs (Shand & Allcroft, 1951), suggests that the reduction in uptake of $I^{131}$ was not due to an antithyroid effect but rather to saturation of the iodine-concentrating mechanism of the gland. It is, of course, possible that long continued administration of phenothiazine preparations of high iodine content resulting in continuous excess circulating plasma iodine may have a goitrogenic effect and this possibility is now being investigated.


### Summary

1. Analysis of various commercial preparations of phenothiazine showed an iodine content ranging from 0.0004 to 0.4 per cent.
2. Administration of some of these preparations resulted in a marked rise in blood iodine values.
3. The significance of these observations is discussed.


*Acknowledgments*—The authors wish to acknowledge the assistance they received from Mr. C. G. Ovenden, Mr. H. G. Stockdale, B.SC., M.R.C.V.S., and Dr. G. E. Foster, F.R.I.C.

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*Note.*—The MS. of this Paper was first received on March 28th, 1955.

## THE REGISTER OF VETERINARY SURGEONS

Under Section 25 (3) of the Veterinary Surgeons Act, 1948, and the provisions of Statutory Instrument No. 1150 of 1953, the names of the following have been removed from the Register of Veterinary Surgeons at the request of the person concerned.

Mr. T. E. Burridge, 9 Tower Gardens, Hythe, Kent. Mr. G. A. Carroll, 615 4th Avenue, South, Puyallup, Washington, U.S.A. Mr. F. V. Collins, Department of Commerce and Agriculture, Adelaide, South Australia. Mr. T. H. Hankin, 70 Seddon Street, Pukekohe, Auckland, New Zealand. Mr. G. Rocker, Killaloan, Clonmel. Co. Tipperary, Eire. Mr. J. M. Sinclair, 70 Montague Avenue, Salisbury, Southern Rhodesia.

## R.C.V.S. LIBRARY ACCESSIONS

FIJI. *Department of Agriculture.* Annual Report, 1954.

GREAT BRITAIN. *Medical Research Council.* Report, 1953-1954.

INTERAFRICAN BUREAU FOR EPIZOOTIC DISEASES. Third annual report, 1954.

LEEDS. CITY. *Medical Officer of Health.* Annual report, 1954.

NEW SOUTH WALES. *Department of Agriculture.* Annual report, 1954.

NEWCASTLE-UPON-TYNE. *Veterinary Officer.* Annual report, 1954.

NORTHERN RHODESIA. *Department of Veterinary Services.* Annual report, 1954.

PENROSE RESEARCH LABORATORY. Report, 1954.

READING. UNIVERSITY. *National Institute for Research in Dairying.* Report, 1954.

UNITED NATIONS. *Food and Agriculture Organisation.* 21st session, 6th to 18th June, 1955. Report of Council.

## SPECIAL CONGRESS NUMBERS OF "THE RECORD"

As last year, it is proposed to publish three special Congress numbers of THE RECORD. It will thus be possible to treat the principal speeches and the social functions topically instead of their having to await an omnibus Congress number as in the past. These issues will be published on September 3rd, 10th and 17th. At the same time, in response to a number of requests, the contents of the journal will be published in full detail for easier reference to news items, correspondence, etc.

# Ringworm

## A Report by the Technical Development Committee of the B.V.A.

THE Technical Development Committee has devoted considerable attention to the problem of ringworm in animals in recent months, following a meeting with Dr. Ainsworth and Sir Archibald Gray, members of the Medical Mycology Committee of the M.R.C., who stressed the growing importance of mycotic conditions in both animals and man, and showed particular concern about the animal reservoir of ringworm infection for humans.

At that discussion it was agreed that articles on ringworm should be prepared for publication in both the veterinary and medical Press and, subsequently, the Committee invited Mr. P. H. Mortimer, M.A., B.V.SC., M.R.C.V.S., of Cambridge, to prepare an article on ringworm in animals and, at the request of Dr. Ainsworth, Dr. C. J. La Touche, of the Departments of Dermatology and Bacteriology, Leeds University, has prepared an article on "The Importance of the Animal Reservoir of Infection in the Epidemiology of Animal-type Ringworm in Man."

It would appear to be generally agreed that for diagnosis of ringworm in small animals, a Wood's light is essential. Good results can also be obtained from culturing suitable material; material negative on microscopic examination may prove positive on culture. Typing of species can, in general, only be achieved by culturing the dermatophyte and noting the rate of growth, gross morphology of colonies, pigmentation and microscopic morphology of culture. Positive diagnosis and typing is a laboratory procedure, requiring widespread facilities throughout the country.

It is hoped that further articles dealing with mycotic conditions will be published from time to time as they become available, and members' attention is meanwhile directed to the following recent contributions: *Vet. Rec.* **67.** 42, 88, 136, 150, 343.

In addition the Committee directed its enquiries to the veterinary schools and research laboratories to ascertain the work proceeding on this aspect of veterinary study, the clinical incidence as indicated by case records, the methods of diagnosis used and the facilities available to clinicians for confirmatory laboratory diagnosis. In all cases the information available indicated awareness of the problem which exists and a readiness to render the maximum assistance possible within the limitations of the Departments concerned.

Workers in the Glasgow School have been conducting a survey over a considerable period to study the relationship of disease in man and animals. A Committee was formed in 1954 consisting of members of the medical and veterinary professions and a mycologist, to study the problem further.

Leeds University, in association with Leeds Veterinary Investigation Centre, has carried out some research into the problem, but the work is still in its early stages.

The Bristol School has the co-operation of Miss English, Research Mycologist, appointed by the Research Committee of the Bristol United Hospitals.

The Cambridge School is working on cattle ringworm in association with dermatologists at the Addenbrooke Hospital (Dr. A. J. Rook and Dr. H. White). Mr. P. H. Mortimer is working on this problem in the Department of Clinical Parasitology.

In the Edinburgh School Mr. E. A. McPherson, M.R.C.V.S., has been studying ringworm fungi for the last two years.

The Liverpool, London and Dublin Schools have all made their clinical records available to the Committee.

The Ministry of Agriculture laboratory at Weybridge and its veterinary investigation centres have been giving special consideration to the problem of mycoses for more than two years and a Mycology Reference Laboratory was established early this year at Weybridge under Mr. P. K. C. Austwick. Mr. Austwick, as many readers will know, has been carrying out a Survey on Animal Mycoses during the past two to three years at the Hatherly Laboratories of the University of the South West at Exeter under Dr. G. C. Ainsworth's leadership—a survey in which many readers have co-operated and on which a preliminary report was published in THE VETERINARY RECORD of February 5th, 1955.

**Arrangements have been made to assist veterinary surgeons in practice in obtaining confirmation of diagnosis of mycotic conditions and laboratory facilities are available at the following centres:—**

### Ministry of Agriculture's Veterinary Laboratory, Weybridge

(*a*) Mycology Reference Laboratory work, *i.e.*, examination of cultures referred to it by other laboratories, including the veterinary investigation laboratories listed below.

(*b*) Laboratory diagnostic examinations for the London area and the counties of Surrey, West Sussex, Hampshire and Dorset, *i.e.*, the area served by the Weybridge centre (see below).

### Veterinary Investigation Centres, Ministry of Agriculture

| | *Counties Covered* |
|---|---|
| ABERDEEN, N. Scotland College of Agriculture, Veterinary Investigation Laboratories, Mill of Craibstone, Bucksburn. (P. L. Shanks, B.SC., M.R.C.V.S.) | |
| ABERYSTWYTH, Ministry of Agriculture and Fisheries, Veterinary Investigation Centre, Dairy Buildings, Llanbadarn Road, Aberystwyth. (L. E. Hughes, M.R.C.V.S., D.V.S.M., N.D.A.) | Brecon, Cardigan, Montgomery, Radnor. |
| BANGOR, Veterinary Laboratory, Bryn Adda, Penrhos Road. (W. T. Rowlands, M.R.C.V.S., D.V.S.M.) | Anglesey, Caernarvon, Denbigh, Flints, Merioneth. |

| | *Counties Covered* |
|---|---|
| BRISTOL, Veterinary Investigation Centre, Langford House, Langford, near Bristol. (D. W. Menzies, M.R.C.V.S.) | Gloucester, Hereford, Somerset, Wilts, Worcs. |
| CAMBRIDGE, Department of Animal Pathology, Milton Road. (H. I. Field, M.SC., M.R.C.V.S.) | Beds, Cambs, Essex, Herts, Hunts, Isle of Ely, Lincoln (Holland), Norfolk, Soke of Peterborough, Suffolk. |
| CARDIFF, Veterinary Investigation Dept., Government Buildings, Ty Glas Road, Llanishan. (D. R. Allen, M.R.C.V.S.) | Carmarthen, Glamorgan, Monmouth, Pembroke. |
| CHESTER, Ministry of Agriculture and Fisheries, Old Government House, 20, Dee Hills Park. (A. Ratter, M.R.C.V.S.) | Cheshire. |
| EDINBURGH, Edinburgh and East of Scotland College of Agriculture, 13, George Square, Edinburgh, 8. (J. A. Watt, PH.D., B.SC., M.R.C.V.S.) | |
| GLASGOW, The West of Scotland Agricultural College, Auchincruive, Ayr. (A. L. Wilson, M.R.C.V.S.) | |
| LEEDS, Quarry Dene, Weetwood Lane, Leeds, 6. (K. C. Sellers, PH.D., B.SC., M.R.C.V.S., D.V.S.M.) | Yorkshire. |
| LIVERPOOL, University of Liverpool, Dept. of Veterinary Pathology, 42/44, Bedford Street North, Liverpool, 7. (N. H. Brooksbank, B.SC., M.R.C.V.S.) | Lancashire. |
| LOUGHBOROUGH, University College of Nottingham, School of Agriculture, Sutton Bonington, Loughborough, Leicester. (J. C. Buxton, PH.D., B.SC., M.R.C.V.S.) | Derby, Leicester, Lincoln (Kesteven and Lindsey), Notts, Rutland. |
| NEWCASTLE UPON TYNE, Veterinary Department, Elswick Hall, Elswick Park, Newcastle upon Tyne, 4. | Durham, Northumberland. |
| PENRITH, Ministry of Agriculture, Merrythought, Calthwaite, Penrith. (G. B. S. Heath, B.SC., F.R.C.V.S.) | Cumberland and Westmorland. |
| READING, Veterinary Investigation Centre, 76, Upper Redlands Road, Reading. (R. M. Loosmore, B.V.SC., M.R.C.V.S.) | Berks, Bucks, Middlesex, Northampton, Oxford. |
| STARCROSS, Staplake Mount, Starcross, near Exeter. (C. V. Watkins, M.R.C.V.S., D.V.S.M.) | Cornwall, Devon, Isle of Scilly. |
| TETTENHALL, Woodthorne, Wolverhampton, Staffs. (W. H. Parker, B.SC., M.R.C.V.S., N.D.A.) | Salop, Stafford and Warwick. |
| WEYBRIDGE, Veterinary Research Laboratory, New Haw, Weybridge. (A. Shand, M.R.C.V.S.) | Dorset, Hampshire, Isle of Wight, Surrey, West Sussex. |
| WYE, Ministry of Agriculture and Fisheries, Veterinary Laboratory, Coldharbour. (J. D. Paterson, M.R.C.V.S.) | Kent, East Sussex. |

## Veterinary Schools

*Bristol.*—By arrangement with the late Professor Blakemore, Miss English, of Bristol United Hospitals, Bristol, is prepared to examine a limited amount of material from animal ringworm cases from the West Country.

*Cambridge.*—The Clinical Parasitological Laboratory, The Veterinary Hospital, Madingly Road, Cambridge. This Laboratory is prepared to receive suspected ringworm material from the *Eastern Counties only.*

*Edinburgh.*—The Department of Veterinary Medicine, Royal (Dick) School of Veterinary Studies, Edinburgh,9. This Department is prepared to receive more material for diagnosis.

*Glasgow.*—Department of Veterinary Pathology, 83, Buccleuch Street, Glasgow, C.3. This department is willing to receive material for diagnosis.

*Liverpool.*—Department of Veterinary Pathology, 42/44, Bedford Street North, Liverpool, 7. This Department is prepared to receive more material.

*London.*—Department of Medicine, Royal Veterinary College, Streatley House, Streatley, Berks. Although this Department cannot offer a diagnostic service as such, it would welcome suspected ringworm material for teaching and research and would advise senders of results of examinations.

## Ministry of Agriculture for Northern Ireland, Veterinary Research Division

The Farm, Stormont, Belfast. The Division is prepared to receive samples for diagnosis.

*Public Health Laboratory Service*

By arrangement with Dr. G. S. Wilson, Director of the Public Health Laboratory Service, assistance is available at the following Public Health Laboratories :—

**ENGLAND**

| *Place* | *Address* | *Pathologist in charge* | *Telephone number* |
|---|---|---|---|
| Bath ... ... ... | Public Health Laboratory, Manor Hospital, Combe Park, Bath | Dr. P. G. Mann ... | Hospital 7250 Bath (7651/2) |
| Bedford ... ... | Public Health Laboratory, General Hospital, Kimbolton Road, Bedford | Dr. W. F. Lane ... | Bedford 66896 |
| Birkenhead ... ... | Public Health Laboratory, 42, Hamilton Square, Birkenhead | Dr. J. M. Ritchie ... | Birkenhead 5484 |
| Birmingham ... ... | Public Health Laboratory, 150, Great Charles Street, Birmingham, 3 | Dr. B. R. Sandiford ... | Central 6921/2 |
| Bournemouth ... | Public Health Laboratory, Gloucester Road, Boscombe, Bournemouth | Dr. G. J. G. King ... | Boscombe 37304 |
| Bradford ... ... | Public Health Laboratory, 16–18, Edmund Street, Bradford | Dr. H. G. M. Smith ... | Bradford 24314 |

| *Place* | *Address* | *Pathologist in charge* | *Telephone number* |
|---|---|---|---|
| Brighton ... ... | Public Health Laboratory, Royal Sussex County Hospital, Brighton, 7 | Dr. J. E. Jameson ... | Brighton 23506 |
| Cambridge ... ... | Public Health Laboratory, Tennis Court Road, Cambridge | Dr. R. M. Fry ... | Cambridge 55526 |
| Carlisle ... ... | Public Health Laboratory, Cumberland Infirmary, Carlisle | Dr. D. G. Davies ... | Carlisle 22332 |
| Coventry ... ... | Public Health Laboratory, Stoney Stanton Road, Coventry | Dr. R. E. Jones ... | Coventry 63256–7 and 5937 |
| Dorchester ... ... | Public Health Laboratory, Glyde Path Road, Dorchester, Dorset | Dr. G. H. Tee ... | Dorchester 1278 |
| Epsom ... ... | Public Health Laboratory, West Hill House, West Hill, Epsom, Surrey | Dr. D. M. Stone ... | Epsom 2474 |
| Exeter ... ... | Public Health Laboratory, 7, Dix's Field, Exeter | Dr. B. Moore ... ... | Exeter 54959 |
| Guildford ... ... | Public Health Laboratory, St. Luke's Hospital, Guildford | Dr. G. T. Cook ... | Guildford 66091 |
| Harrogate ... ... | Public Health Laboratory, Harrogate and District General Hospital | Dr. D. J. H. Payne ... (part-time supervision) | Harrogate 84077 |
| Hereford ... ... | Public Health Laboratory, County Hospital, Hereford | Dr. D. R. Christie ... | Hereford 4696 |
| Hull ... ... ... | Public Health Laboratory, 184, High Street, Kingston-upon-Hull | Dr. J. McCoy ... ... | Hull 35371 |
| Ipswich ... ... | Public Health Laboratory, Borough General Hospital, Woodbridge Road, Ipswich | Dr. P. H. Martin ... | Ipswich 77261/2 |
| Leicester ... ... | Public Health Laboratory, Isolation Hospital, Groby Road, Leicester | Dr. N. S. Mair ... | Anstey 2383 |
| Lincoln ... ... | Public Health Laboratory, St. Anne's Road, Lincoln | Dr. J. M. Croll ... | Lincoln 8607 |
| Liverpool ... ... | Public Health Laboratory, City Laboratories, 126, Mount Pleasant, Liverpool, 3 | Prof. D. T. Robinson ... | Royal 3636/7 |
| London (Colindale) ... | Central Public Health Laboratory, Colindale Avenue, London, N.W.9 | Lt.-Col. H. J. Bensted... | Colindale 7041 |
| London (County Hall) | Bacteriological Laboratory (M.R.C.), Room 617, County Hall, Westminster Bridge, S.E.1 | Dr. A. J. H. Tomlinson | Waterloo 3467 |
| Luton ... ... ... | Public Health Laboratory, Luton and Dunstable Hospital, Lowson Road, Luton | Dr. J. H. C. Walker ... | Luton 6807 |
| Manchester ... ... | Public Health Laboratory, Monsall Hospital, Newton Heath, Manchester, 10 | Dr. M. T. Parker ... | Collyhurst 2733 |
| Middlesbrough ... | Public Health Laboratory, General Hospital, Ayresome Green Lane, Middlesbrough | Dr. A. R. Blowers ... | Middlesbrough 87766 |
| Newcastle upon Tyne | (*a*) Public Health Laboratory, General Hospital, Westgate Road, Newcastle upon Tyne, 4 | Dr. A. I. Messer ... | Newcastle 34920 |
| | (*b*) Public Health Laboratory, Government Buildings, Ponteland Road, Newcastle upon Tyne, 5 | Dr. R. Norton ... ... | Newcastle 86.9319 |
| Northallerton ... | Public Health Laboratory, Friarage Hospital, Northallerton, Yorks | Dr. D. J. H. Payne ... | Northallerton 88 |
| Northampton ... | Public Health Laboratory, General Hospital, Northampton | Dr. L. Hoyle ... ... | Northampton 347 |
| Norwich ... ... | Public Health Laboratory, Bowthorpe Road, Norwich | Dr. L. M. Dowsett ... | Norwich 28145 |
| Nottingham ... ... | Public Health Laboratory, 63, Goldsmith Street, Nottingham | Dr. G. B. Ludlam ... | Nottingham 41304 |
| Oxford ... ... | Public Health Laboratory, Walton Street, Oxford | Dr. R. L. Vollum ... | Oxford 47884/5 |
| Peterborough ... ... | Public Health Laboratory, Peterborough and District Memorial Hospital, Midland Road, Peterborough | Dr. C. C. B. Gilmour... | Peterborough 2277 |
| Plymouth ... ... | Public Health Laboratory, South Devon and East Cornwall Hospital, Greenbank Road, Plymouth | Dr. C. H. Jellard ... | Plymouth 63997 |
| Portsmouth ... ... | Public Health Laboratory, " G " Block, Infectious Diseases Hospital, Portsmouth | Dr. K. E. Hughes ... | Portsmouth 74785/6/7 |
| Reading ... ... | Public Health Laboratory, Battle Hospital, Reading | Dr. N. Wood ... ... | Reading 2957 |
| Salisbury ... ... | Public Health Laboratory, General Infirmary, Salisbury | Dr. M. S. Pereira ... | Salisbury 2950 |
| Sheffield ... ... | Public Health Laboratory, City General Hospital, Sheffield, 5 | Dr. E. H. Gillespie ... | Sheffield 36253 |
| Shrewsbury ... ... | Public Health Laboratory, Royal Salop Infirmary, Shrewsbury | Dr. A. C. Jones ... | Shrewsbury 4389 |
| Southend ... ... | Public Health Laboratory, Westcliff Hospital, Balmoral Road, Southend-on-Sea | Dr. R. Pilsworth ... | Southend 45440 |
| Stafford ... ... | Public Health Laboratory, Martin Street, Stafford | Dr. R. N. Phease ... | Stafford 377 |
| *Sunderland ... ... | Public Health Laboratory, Sunderland | Dr. P. B. Crone ... | Sunderland 4462 |
| Taunton ... ... | Public Health Laboratory, Musgrove Park Hospital, Taunton | Dr. J. A. Boycott ... | Taunton 5753 and 3662 |
| Truro ... ... ... | Public Health Laboratory, Royal Cornwall Infirmary, Truro | Dr. F. D. M. Hocking (acting) | Truro 3029 |
| Wakefield ... ... | Public Health Laboratory, County Medical Offices, Wood Street, Wakefield, Yorks | Dr. L. A. Little ... | Wakefield 2207 |

* To be transferred shortly to the Havelock Hospital, Hylton Road.

| | | | |
|---|---|---|---|
| Watford ... ... | Public Health Laboratory, Peace Memorial Hospital, Watford | Dr. B. H. E. Cadness-Graves | Watford 2369 |
| Winchester ... ... | Public Health Laboratory, Royal Hants County Hospital, Winchester | Brig. H. T. Findlay ... | Winchester 3807 |
| Worcester ... ... | Public Health Laboratory, Royal Infirmary, Worcester | Dr. R. J. Henderson ... | Worcester 2697 |
| | **WALES** | | |
| Aberystwyth ... ... | Public Health Laboratory, Cardiganshire General Hospital, Aberystwyth | Dr. M. V. N. Sudds ... | Aberystwyth 216 |
| Cardiff... ... ... | Public Health Laboratory, Institute of Preventive Medicine, The Parade, Cardiff | Dr. Scott Thomson ... | Cardiff 29110 and 5827 |
| Carmarthen ... ... | Public Health Laboratory, Penlan Road, Carmarthen | Dr. W. Kwantes ... | Carmarthen 7271 |
| Conway ... ... | Public Health Laboratory, "Bryn Hyfryd," Conway | Dr. A. J. Kingsley Smith | Conway 2178 |
| Newport (Mon.) ... | Public Health Laboratory, County Hall, Newport, Mon. | Dr. R. D. Gray ... | Newport 65431 |

**It is recommended that veterinary surgeons who wish to take advantage of these facilities should make contact with the laboratory concerned and ascertain requirements in respect of information and material necessary for laboratory diagnosis.**

## A Case of Biliary Calculus and Jaundice in a Cow

BY

**E. J. H. FORD**

**Boots Pure Drug Co., Ltd., Research Department, Veterinary Science Division, Thurgarton, Notts**

*Subject*

A six-year-old attested Ayrshire cow.

*History, symptoms and course*

The cow, which appeared to be in normal health and good condition, had delivered a large male calf without assistance two days previously. Advice was sought because the appetite was poor and the milk yield was not as high as had been expected. On examination the cow's temperature was found to be 102° F, respirations were slightly accelerated and her nose was dry. Rumen movements were absent and the nasal and oral mucous membranes had a faint yellow tinge. Faeces were soft and the cow moved with a stilted gait, swaying on the hind legs with the hock joints stiff and over-extended. A sample of blood was withdrawn from the jugular vein and 250 ml. of a solution containing 20 per cent. calcium borogluconate and 5 per cent. magnesium borogluconate were injected intravenously. It was learned later that serum calcium, magnesium and inorganic phosphate values were 9.9, 2.9 and 2.4 mg. per 100 ml. respectively. Next day the gait was normal and the appetite slightly improved with rumen contractions weak and infrequent.

A day later the appetite was worse and there was a distinct yellow tinge in the visible mucous membranes. Pain could be elicited by pinching the back or pressing on the sternum. In view of the symptoms of pain in the anterior abdomen, reticulitis with possibly liver involvement was suspected and an exploratory rumenotomy was carried out next day. No foreign body was detected though reticulo-diaphragmatic adhesions were probably present. At this time a Rothera test on the milk was positive and 400 ml. of 50 per cent. glucose solution were injected intravenously.

Three days later the cow's temperature was 102° F, abdominal pain was not marked but appetite was absent and diarrhoea was apparent. A Rothera test on the milk was now negative but a faecal smear showed groups of acid-fast bacilli.

Two days after this and eight days after the first examination it was decided to slaughter the cow as the jaundice and diarrhoea were increasing in severity and faecal smears contained many groups of acid-fast bacilli.

*Post-mortem examination*

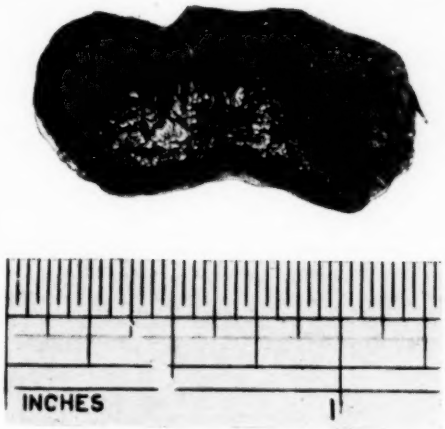
The carcase was in good condition and there was ample abdominal fat. The fat, serous membranes and mucous membranes all had a distinct yellow colour. The intestinal mucosa had thickened areas and smears were rich in groups of acid-fast bacilli. The reticulum and liver both had extensive adhesions to the diaphragm. The liver was also swollen and the cut surface had a greasy appearance. The greater part of the organ and especially that part adjacent to the diaphragmatic adhesions was very tough due to the presence of much new fibrous tissue.

In the common bile duct just beyond the junction of hepatic and cystic ducts was an irregular cylindrical obstruction with a very fine central aperture. The gall bladder was full and turgid but not obviously distended.

The calculus (see accompanying illustration) was about 1½ inches long by ½ inch diameter and of a deep brown colour. Although it caused partial obstruction of the bile duct, there was a very small central aperture and blockage was not complete.

On section the calculus had a waxy appearance and there was no evidence of a nucleus. Rough qualitative analysis showed the presence of calcium, phosphate, carbonate, bile pigments and cholesterol. Unfortunately quantitative analysis was not carried out.

(*Continued on page* 635)




### Discussion

Hutyra, Marek & Manninger (1938) state that casts of the bile ducts are sometimes found in cattle usually in association with liver fluke infestation. This cow was not harbouring liver fluke and from the paucity of references to the condition it appears that bile duct obstructions in the absence of liver fluke are rare in British cattle.

It is possible that in the case reported here the cast in the bile duct, by obstructing the flow of bile to the intestines, was responsible for the symptoms of jaundice and abdominal pain, Johne's disease being merely coincidental.

On the other hand the condition could have originated from a foreign body which earlier in the animal's life caused the diaphragmatic adhesions and liver fibrosis. Although the liver has much reserve tissue the resulting interference with liver function might have been sufficient to encourage precipitation in the bile duct and formation of the cast.

A third possibility is that the infection with *M. johnei* may have had some part in the causation of the calculus.

Although it is generally agreed that Johne's disease has a profound effect on the metabolism of infected animals there is little detailed information on the mechanism of the interference. Admittedly the cellular changes in the intestinal mucosa must reduce absorption of the products of digestion yet many animals die in a state of extreme emaciation when only a short length of the intestine has an altered structure. The writer has noticed that some advanced cases of Johne's disease show at *post mortem* a generalised icteric pigmentation with severe fatty changes in the liver, the hepatic cells being almost replaced by fat globules. In these circumstances conditions favourable for the accumulation of a biliary calculus may exist. Against this theory it may be argued that biliary calculi should be more common in view of the prevalence of Johne's disease, yet only a small proportion of cases show a severe liver involvement and only rarely would the changes have existed long enough to allow the deposition of a calculus.

It is not suggested that this third suggestion is the most likely explanation of the present case, and it is clear that until more is known of the conditions which favour deposition of the constituents of the bile in herbivores the exact sequence of events in cases such as the one described here will remain a matter for speculation.

*Acknowledgments.*—I am grateful to Mr. D. L. Hughes, F.R.C.V.S., DIP.BACT., for permission to publish this case history.

#### Reference

HUTYRA, MAREK & MANNINGER. (1938). Special Pathology and therapeutics of the diseases of domestic animals. 4th ed. London : Baillière, Tindall & Cox.

## Current Literature

### BOOK REVIEWS

**Gaiger and Davies, Veterinary Pathology and Bacteriology.** G. O. DAVIES. 4th edition. Baillière, Tindall & Cox, London. 800 pp., 200 illus. 42s.

Since 1932 many generations of veterinary surgeons have been indebted to "Gaiger and Davies." This standard work has been, and continues to be the textbook of choice of British veterinary students. It has now appeared in its fourth edition. Davies makes it clear in the preface that this edition is by way of being an interim edition, and the alterations are revisions of the existing text to bring it up to date. It is acknowledged by the author that the time has come for the work to be re-drafted and re-written so as to bring it into line with the more modern approach to the teaching of pathology to undergraduate students. This being so it would be unfair to labour omissions of certain subjects on which recent research has provided information. Teachers and many others concerned with pathology and bacteriology will await with interest the new and completely revised edition promised by the author.

**Regional and Applied Anatomy of the Domestic Animals.** JOHN A. TAYLOR. Oliver & Boyd, London and Edinburgh. 25s.

Regional and Applied Anatomy of the Domestic Animals by John A. Taylor could be described as "anatomy without tears," although it will be limited in appeal to the pure anatomist.

It is essentially a text built around a series of excellent drawings and diagrams, which combine that rather rare feature of being clearly yet accurately drawn, and simply and effectively labelled. The text is explanatory and contains not only broad anatomical data but also brief references to the pathological processes that the structures under consideration are liable to be involved in.

The section under review covers only the head and neck of the domestic animals. Further sections on the limbs, thorax and abdomen are in the course of preparation, and will be awaited with considerable interest.

This work should be of most value to the student of surgery, and to the practising veterinary surgeon, both of whom will find easily obtainable information, with the minimum of effort.

It is printed on good paper, but time will tell whether the rather unconventional binding will stand up to constant use.

# News and Comment

## PORTRAIT PRESENTED TO THE R.V.C.

A pleasant ceremony took place last week at the Royal Veterinary College when a portrait of Lieut.-Colonel Amin Chand Aggarwala, B.SC., M.R.C.V.S., A.L.R.O., Principal of the Rajasthan Veterinary College, Bikaner, was presented to the College by Mr. R. Mohan, P.V.S., in the presence of a number of Indian students. The portrait was received by Professor McCunn, vice-Principal.

Mr. Mohan, one of his old students, now working at the Ministry of Agriculture Veterinary Laboratory at Weybridge, has given us the following note on Lieut.-Colonel Aggarwala's career.

I have the privilege to present to the Royal Veterinary College, London, a portrait of Lieut.-Colonel Amin Chand Aggarwala, B.SC. (HONS.), M.R.C.V.S., A.L.R.O., Principal, Rajasthan Veterinary College, Bikaner (India), who qualified from the London College in July, 1924.

Born on July 26th, 1900, at Jullundur Cantt., Lieut.-Colonel Aggarwala hails from the famous Aggarwala family of Punjab. With a uniformly successful school and college career, winning open competitive scholarships and several other distinctions, Lieut.-Colonel Aggarwala won the Punjab University Scholarship for first place in the B.Sc. Hons. (Zoology) examination. Later he was selected as one of the five Government of India State Scholars to study veterinary science in the United Kingdom. He joined the Royal Veterinary College, London, in October, 1921, and graduated in July, 1924.

On his return to India, he was appointed Professor of Animal Husbandry and Milk and Meat Hygiene at the Punjab Veterinary College, Lahore.

In 1936, he acted as Secretary-Adviser to Dr. N. C. Wright, when the latter went to India to enquire into the problems of the cattle and dairy industries in India, in which capacity he did much valuable work. In 1939, he was appointed as Professor of Pathology and Bacteriology at the Punjab Veterinary College, Lahore.

He was appointed Principal and Professor of Veterinary Medicine, Punjab Veterinary College, Lahore, in March, 1946, which post he held with great credit until partition of the Punjab in August, 1947.

He was entrusted with the difficult task of starting the East Punjab Veterinary College at Hissar in February, 1948, and within the short period of 18 months he made that institution the pride of the Province and the best amongst all the post-partition institutions set up by the Government. In November, 1949, he was appointed Director, Veterinary Services and Warden of Fisheries, Punjab, which office he held for three years. He also acted as Dean of the Veterinary Faculty and Fellow of the Punjab University for a number of years. The Government of Rajasthan were fortunate to secure his services in October, 1954, for their newly opened Veterinary College at Bikaner.

The credit for all he has accomplished rightly goes to his *Alma Mater*, the Royal Veterinary College, London, and the distinguished members of the staff of that College.

The portrait is presented as a mark of respect to an eminent Indian veterinary educationist, who has done yeoman service to the cause of veterinary education in India.

## MEMORIAL SERVICE FOR PROFESSOR BLAKEMORE

A Memorial Service for Professor Frederick Blakemore was held at the Congregational Church, Langford, on Saturday, August 13th, at 3 p.m. The service was conducted by the Rev. J. Jones. There was present a large gathering, including members of the University and Ministry of Agriculture staffs and representatives of many outside bodies. The Royal College of Veterinary Surgeons was represented by Professor L. P. Pugh, Vice-President. The address was given by Professor MacGregor Skene. Among those present were:—

*Members of the family:* Mrs. Blakemore, widow; Mr. Michael Blakemore, son; Dr. and Mrs. T. Moore; Mr. James Moore.

Dr. H. T. Tanner, Treasurer of the University, also representing the Vice-Chancellor. Professor T. F. Hewer, Dean of the Faculty of Medicine. Mr. A. Fraser and Mr. E. C. Wright, Assistant Registrars, also representing the Registrar, and Sir R. Verdon Smith, Chairman of Council. Professor C. W. Ottaway; Professor W. Baker; Professor A. R. Collar; Professor A. Messervy; Professor and Mrs. R. Milnes Walker; Professor A. N. Neale; Professor and Mrs. A. G. Pugsley; Professor R. C. Tress; Professor W. F. Whittard; Professor and Mrs. A. W. Yemm; Mr. J. Shum Cox, Librarian of the University; Mr. Ralph Brentnall, Architect to the University; Lord Waldegrave; Professor Glover, Dean of the Royal Veterinary College; Mr. J. N. Ritchie, Chief Veterinary Officer, Ministry of Agriculture and Fisheries, also representing the Ministry of Agriculture and the Agricultural Improvement Council; Mr. H. F. Hebeler, also representing the British Veterinary Association, and Western Counties Veterinary Association; Dr. A. W. Stableforth, Director of Ministry of Agriculture Laboratory, Weybridge; Mr. D. L. Stewart, also representing the Animal Breeding Society; Mr. R. Clarke, also representing Mr. C. J. Harrison of Horlicks Ltd., and Mr. R. M. Barnes of Horlicks Farms and Dairies; Mr. D. W. Menzies, also representing Mid-West Veterinary Association; Mr. G. Tullis, Divisional Officer for Somerset, Animal Health Division, Ministry of Agriculture; Dr. A. J. Wilsdon, Divisional Veterinary Officer for Hereford; Mr. J. R. Hudson, also representing Veterinary Research Club; Mr. J. A. J. Venn, also representing Ministry of Agriculture Veterinary Laboratories, Langford; Mr. C. Ross, Provincial Director, National Agricultural Advisory Service; Mr. B. M. Kerruish, also representing the Milk Marketing Board; Mr. J. A. Croxford, also representing the British Council; Mr. J. W. Dallas, County Agricultural Officer; Mr. G. B. Vowles, also representing the Centaur Society; Mr. P. M. Keen, also representing Final Year Students, and Mr. E. M. Owen.

*Members of the University Staff:* Dr. C. A. Ashford; Miss Bond; Miss Capel; Mr. A. Carlyle; Dr. R. J. Garner; Miss Goddard; Dr. J. R. Holmes; Dr. P. Jaffe; Dr. and Mrs. J. A. Laing; Mr. J. Maffey; Mr. and Mrs. Manners; Mr. M. R. McCrea; Mr. A. D. Osborne; Mr. A. E. S. Roberts; Col. D. I. C. Tennant; Dr. D. E. Tribe; Mr. W. Crawley and Mr. R. Undrill, also representing Technical Staff at Langford House; Mr. W. Green, also representing Farm Staff at Langford House; and Mrs. M. J. Field, also representing Clerical Staff at Langford House.

*Others present:* Dr. Muriel Robertson, F.R.S.; Dr. and Mrs. J. S. Patterson; Mr. J. P. Frappell; Dr. H. Cembrowicz; Mr. P. H. Chivers; Mr. C. M. Peatt; Dr. and Mrs. D. R. Gray; Mrs. M. Hudson and Miss G. Hudson, and the Rev. R. Paget.

## AN APPRECIATION

Professor Ottaway writes:—

Frederick Blakemore's name will live in science; of that there is no doubt, such will be recorded and history will honour him. But, at the moment, I would write a personal note from Bristol, the scene of his greatest triumph where many have learnt to know him so well and respect him so much.

Following outstanding work at Cambridge as Head of the Ministry of Agriculture's Veterinary Advisory Service, Blakemore undertook the most important post of his brilliant career—Director of Veterinary Studies in the University of Bristol. The success of this new venture in veterinary education depended almost entirely on the personality, skill and wisdom of the chief. Bristol needed the best available; in Blakemore they found their man, and to him is due the credit for all that has been done. His enthusiasm and energy knew no bounds. He was familiar with all the many problems attendant upon a great task: his foresight and judgment were exceptional, his conduct in everything—administration, teaching, research—of the highest order.

His untimely death as he was approaching the zenith of his career is a great tragedy. Personally we have lost a great friend and noble leader, the University a trusted servant and the profession one of its most famous sons. He will not be forgotten. To his courageous wife and young family we must extend our deepest sympathy.

## THE TOM NEWMAN MEMORIAL AWARD

In connection with this prize, awarded to Dr. Williams Smith, we learn that it was made by the Poultry Association in the light of the following papers published by Dr. Williams Smith during 1954.

Food as a Vehicle of Infection: The Effect of Variations in the Diet on the Induction of Salmonella Gallinarum Infection; Serum Levels of Penicillin, Dihydrostreptomycin, Chloramphenicol, Aureomycin and Terramycin in Chickens; Isolation from the Lower Respiratory Tract of Chickens of Bacteria administered by Mouth; The Use of Furazolidone in the Treatment of Experimental Fowl Typhoid; Pathogenicity and Haemolytic Properties of Staphylococci Isolated from Chickens; Experimental Staphylococcal Infection in Chickens; The Treatment of Salmonella Pullorum Infection in Chicks with Furazolidone, Sulphamerazine, and Chloramphenicol.

This scientist, who is attached to the staff of the Farm Livestock Research Station of the Animal Health Trust, had extended his work on salmonella to poultry in order to have the facility of working with numbers.

## PERSONAL

### Births

EDWARDS.—On August 4th, 1955, to Nesta, wife of C. M. Edwards, B.V.SC., M.R.C.V.S., Bangor, a daughter.

HARRISON.—On August 10th, 1955, at Butleigh Hospital, Glastonbury, Somerset, to Rosemary, wife of W. J. Harrison, B.V.SC., M.R.C.V.S., a son.

SEAWRIGHT.—On August 8th, 1955, to Betty, wife of David Seawright, M.R.C.V.S., Little Broughten, Cockermouth, Cumberland, a daughter, Carol.

## CAPTAIN J. R. BARKER

Dr. Tom Hare writes:—

John Barker, of Hereford, was called to his rest on July 28th.

Imagining a pageant of veterinary history I saw John Barker cast as John Bull; the big, upright, four-square, kindly yeoman of England. He required little make-up for the part; a trifle more bridge to the nose, a pair of side whiskers and a trifling adjustment of the embonpoint. His straight gaze from wide-spaced eyes; his resolute chin rounding a strong jaw; his full-lipped mouth which could charm with a smile; he was a commanding figure. John had the aptitude for going straight to the heart of things. In technical work, as in veterinary politics, he impressed his generation.

My friendship with John Barker began in 1925. He was not satisfied with the current nomenclature and symptomatic treatments of the more prevalent diseases of cattle in his part of the country. From assiduous clinical examinations, particularly of the respiratory tract, of such conditions as "fog fever," "husk," "bracken poisoning," he had decided that he must correlate such work in future with systematic pathological studies. Thus our long collaboration began. He took meticulous care over the collecting, recording and packing of materials for dispatch to the laboratory. He was the first member in private practice, known to me, who explored the use of vacuum—and iced—containers for specimens requiring bacteriological examination. By the early thirties he had collected records of a substantial number of outbreaks of respiratory infections of cattle, for which he had applied autogenous vaccine therapy with encouraging results. Out of this and subsequent work came his series of papers and extempore talks, which enlarged our knowledge of bovine pneumonia, bronchitis, catarrh and so-called bracken poisoning. His skill and knowledge of bovine infectious disease was widely sought in a consultant capacity. Many of his former pupils and assistants continue to practice John Barker's methods of investigation and vaccine therapy for bovine respiratory infections.

For 25 years John Barker played a conspicuous part in veterinary politics. In my opinion he made his most outstanding contributions to policy thoughout the thirties. As a result of the economic crisis of 1931, private practice was faced with adversity and the encroachments of the developing veterinary services of the State and Animal Welfare Societies. Throughout the greater part of 10 strenuous years, Council N.V.M.A. struggled to devise ways and means of maintaining the unity of the profession and equipping it worthily to discharge its duty. To this work John brought a serene confidence in the worth of private practice, a shrewd appraisal of the advantages and limitations of state administration and a flair for finding the middle way which works. We all have our moods and whimsies; John was no exception; he could be critical, stern, unyielding. But his contemporaries on Council will more readily recall John's genial way of finding the right words to calm ruffled tempers and secure general agreement. In his first speech after installation as President, N.V.M.A., at the Belfast Congress of 1935, John said: "During my year of office it will be my endeavour to secure the co-operation of all sections of the profession." These words epitomise his work as member of Council. He was happiest in the rôle of chairman and conciliator.

Except for one occasion, John seemed to shed an aura of aloofness. Both of us were intent on securing the incorporation of veterinary education within the universities. And then came our acute disagreement over the Loveday Report. John wanted it; I would not accept the parts which were unjust and humiliating to the Royal College. John pleaded with me, so gently, so understandingly; he was shocked and pained by my desertion of the cause he held so dear. When he knew I was adamant, his concluding comment was characteristic: "Well, Tom, I've never met such an independent lot of blighters as are turned out by the Liverpool School." Momentarily he forgot he was Liverpool to the core.

All who recall the joy of meeting John and Mrs. Barker at congress and functions will treasure his photograph, which was published in THE VETERINARY RECORD, 1935, Vol. 15, page 1008. There in the prime of physical and mental vigour sits the kindly conciliator and chairman of committee. One essential is missing from that photograph—his cigarette, emblem of his imperturbability. When his committee was "lit-up" by the heat of debate, John would slowly roll his baccy into a fag, clear its shaggy ends, fit it into his holder, search for his lighter, take a mouthful of smoke, and then calmly set about restoring harmony and finishing the business.

★

Mr. G. N. Gould writes:—

John Barker was my friend from the time we first met on the Survey Committee in 1939. He was a man of strong character and outstanding ability, who exemplified one's conception of a practising veterinary surgeon of great experience and achievement.

He was extremely well read in veterinary science, was always reading, and engendered confidence in all who met and listened to him. He not only commanded an outstanding position in the affairs of the "National" over many years, but found time for public duties in many spheres—as Chairman of the Justices, Town Councillor, Chairman of the Conservative Party, Chairman of the Football Club, and by work and interest in many other spheres, he achieved a national and international reputation, particularly by his clinical observation in respect of the recumbent cow and associated metabolic conditions.

One of his last efforts on the "National" was to ensure that adequate facilities should be made available for field trials of new therapeutics and it would seem that his initiative in this matter is likely to bear fruit in the near future.

He always extended to Presidents of the "National" that strong personal support which means so much to those who have to take responsibilities in such an onerous post. His invariable comment when difficulty arose was, "Well, let's see how we can help with this," and if persuaded it was for the good of the profession, his help was assured and very practical.

He had the power of swaying Council by his very shrewd, practical approach to problems and the very determined way in which he presented his case—always with the common-sense interests of the profession in mind.

A man of character—one's conception of a country veterinary surgeon fulfilled—a strong, determined man, but above all, a man of many kindnesses. He will be greatly missed by those who had the privilege of knowing him, and by the profession as a whole.

The sincere sympathy of the whole profession will, I am sure, be extended to his charming wife, who is so well known to many of us, and his family.

## COMING EVENTS

### September

2nd (Fri.). Ordinary General Meeting of the South Wales Division, B.V.A., at the Castle of Brecon Hotel, Brecon, 2.15 p.m.

**4th to 10th. 73rd Annual General Meeting and Congress of the British Veterinary Association at Belfast.**

6th (Tues.). Annual General Meeting and Dinner of the University of Glasgow Veterinary School Alumnus Association at Thompson's Restaurant, Donegal Place, Belfast, 6 p.m.

8th (Thurs.). Summer General Meeting of Eastern Counties Veterinary Society at Cambridge. Tour of Veterinary School. President's Invitation Tea. Shipley Bowls Tournament.

30th (Fri.). Meeting of the Welsh Branch, B.V.A., at Aberystwyth.

## ADDRESSES OF DISEASE INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

### Anthrax

*Durham*. High Rowntree, St. John's Chapel, Bishop Auckland (Aug. 8).

*Midlothian*. Cockdurno Company, Cockdurno Farm, Balerno (Aug. 8).

*Northants*. Lilford Lodge, Barnwell, Peterborough (Aug. 5).

*Staffs*. 12, Holding, Barlaston Road, Cocknage, Longton, Stoke-on-Trent (Aug. 15).

*Lincs*. Usselby Villa, Minting, Horncastle (Aug. 12).

*Westmorland*. Hallbeck Farm, Killington, Kirby Lonsdale (Aug. 9).

*Yorks*. Notton Green Farm, Notton, Wakefield (Aug. 9); Manor House, Ardsley, Barnsley (Aug. 12); West Flotmanby, Filey (Aug. 13).

### Atrophic Rhinitis

*Notts*. Coxmoor Farm, East Kirkby (Aug. 15).

### Fowl Pest

*Cambs*. King's Farm, Welches Dam (Aug. 10).

*Hereford*. Forge, Pudleston, Leominster (Aug. 8).

*Hunts*. Meadow Lane, Henningford Grey (Aug. 9).

*Lancs*. Moss Side Farm, Out Rawcliffe, Preston (Aug. 10).

*Lincs*. 20, Burton Lane, Billingborough, Sleaford (Aug. 9).

*Norfolk*. 3, Council Houses, Greyland Lane, Banham, Norwich (Aug. 11); Near Black Boy Public House, Stockton (Aug. 12); Stone House, Thurgarton, Aldborough, Norwich (Aug. 9); Kendall Lodge Farm, Carleton Rode, Norwich (Aug. 11); Fold 68, Midde Farm, Corkway Drove, Feltwell (Aug. 12); Crosskeys Cottage, Brampton, Norwich (Aug. 16).

*Somerset*. 5, West Street, Wiveliscombe, Taunton (Aug. 16).

*Sussex*. Stroud Farm, Wivelsfield Green, Haywards Heath (Aug. 16).

*Warwicks*. Lower Farm, Preston on Stour, Stratford-on-Avon (Aug. 9).

*Yorks*. Handsworth Hall Farm, Finchwell Road, Sheffield (Aug. 11).

### Swine Fever

*Ches*. Hartford Hall, 81, School Lane, Hartford, Northwich (Aug. 10).

*Denbigh*. Cae Mawr, Llandegla, Wrexham (Aug. 12).

*Essex*. Great Burches Farm, Thundersley (Aug. 10); Havering Riding School, Havering Green, Havering Atte Bower, Romford (Aug. 16).

*Flints*. Bodlonde's Farm, Greenfields, Mold (Aug. 9); Kinnerton Hall, Kinnerton (Aug. 11).

*Hants*. Greywells, Basingstoke (Aug. 10).

*Herts*. Hope Cottage Farm, Flamstead End, Cheshunt, Waltham Cross (Aug. 10).

*Lancs*. 5, Pemberton Valley (off Tunstall Lane) Wigan (Aug. 15).

*Leics*. Hall Farm, Broughton Astley (Aug. 15).

## CORRESPONDENCE

*The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.*

### GAMMA GLOBULIN

Sir,—It appears to me that the use of the phase "now old fashioned serum," referring to distemper serum, in an article quoted from *The Field* is not calculated to increase the faith of the dog-owning public in therapeutic agents which are at the moment widely used and depended upon.

The public should be informed of technical developments with circumspection, and the work of the Animal Health Trust should be made known by well timed and appropriate articles.

Yours faithfully,

GORDON COX.

8, Paul Street,
Taunton.

*August 9th*, 1955.

## ACUTE POISONING OF CATTLE BY COMMON RAGWORT (*Senecio jacobaea*, L.)

Sir,—Early in February, 1952, one of us (R.S.C.) was called to attend animals among a group of 65 Friesian in-calf and maiden heifers yarded on a farm in Leicestershire. The first animals to show clinical symptoms died within two days, and by the end of March, 34 members of the group were dead. A further nine animals died at intervals from then until the end of September. Of the 43 fatal cases, 30 were in pregnant and 13 in non-pregnant heifers. The principal symptoms, which in some cases were prefaced by dullness and listlessness, included acute diarrhoea, persistent straining, staggering, partial blindness and excitability. *Post-mortem* examination of the earlier cases revealed inflammation of the abomasum with few other macroscopic changes, but as time went on a progressive degree of hepatic cirrhosis became evident, and senecio poisoning was diagnosed in one of the animals sent while still alive to Weybridge for study. Toxicological examinations for other possible causes of death were negative, and no evidence of liver fluke infestation was encountered.

These losses led to a claim that formed the subject of a hearing in the Queen's Bench Division (Bonser *v.* East Anglian Grass Meal Company, 1954), when we were among the professional witnesses called by both sides and as a result of which it was found that the deaths were attributable to the consumption, over a short period, of cubes prepared from lucerne that had been cut from a field heavily contaminated with common ragwort (*Senecio jacobaea* L.). The exact time that had elapsed between the first feeding of the contaminated cubes and the onset of symptoms could not be fixed with certainty, but it was accepted by the Court that it was of the order of 5 to 10 days. The first death certainly seemed to have occurred within a fortnight of the commencement of feeding the incriminated batch of cubes. The estimated individual consumption was 8 lb. daily, although as is customary in the feeding behaviour of yarded stock the socially dominant animals consumed larger quantities than the remainder and were in fact among the first to become affected. The ragwort content of the cubes must, on the basis of later examinations of residual samples, have varied considerably. The nuts available for feeding test were presumably of lower content than the average. A calf of 143 kg. body-weight consumed about 150 lb. over a period of 26 days at Weybridge. No symptoms were shown for nine weeks after which period the calf was slaughtered. Cirrhosis was present in the liver; but the lesions were not extensive.

Acute seneciosis in cattle has been reported from South Africa and elsewhere from the consumption of species such as *Senecio latifolius* that have relatively high contents of some of the toxic alkaloids found in this genus, but in Great Britain and Ireland all the cases hitherto reported as due to the consumption of pasture or hay contaminated with *S. jacobaea* appear to have been of a chronic nature with death occurring in from 60 days to many months after the commencement of feeding, and often long after the contaminated material had been withheld (see, *e.g.*, Stockman, 1917; Leyshon, 1925; Craig, Kearney & Timoney, 1930; Reynolds, 1936; Bisset, 1936). Many plants are most toxic in the early stages of growth, and in the cases of poisoning by *Senecio ruwenzoriensis* S. Moore investigated by one of us (J.R.H.) there was strong presumptive evidence that when a few inches high this species was more toxic than when mature.

Normally cattle do not eat common ragwort in its young stages, but in the outbreak investigated by us the presence of a relatively high proportion of ragwort in the cubes was responsible for some deaths of an acute nature and it seems likely that the presence of lucerne masked the unpalatability of the ragwort. Moreover, selection cannot be exercised by cattle fed on compressed cubes as they can when grazing; they must consume the cubes as a whole or not at all. The cubing process involved (extrusion) has been found (Moon & Raafat, 1951) when applied to bracken not to decrease toxicity significantly. The growing menace of ragwort infestation, combined with developments in grass and green-crop drying, indicates that this is a new agricultural hazard and that vigilance is necessary in order to prevent further similar occurrences.

During the course of our investigations, we have been able to devise methods for the identification of ragwort tissue in microscopical preparations of affected cubes and other contaminated materials, and to confirm that *S. jacobaea* produces in young rats a fatal condition comparable with that resulting in a similar time from the ingestion of similar quantities of dried marsh ragwort, *Senecio aquaticus* Huds, as described by Evans & Evans (1949). These findings, together with a full account of the outbreak among the Friesian heifers, will be reported in detail in consultation with other professional witnesses involved.

Yours faithfully,

R. S. COCKBURN
(Coalville).
GEORGE EATON
(Hallaton).
J. R. HUDSON
(Weybridge).
K. G. MORGAN
(Animal Health Trust,
Houghton Grange,
Huntingdonshire).
ERIC C. WOOD
(Public Analyst, Norwich).
ALASTAIR N. WORDEN
(Cromwell House,
Huntingdon).

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